EXECUTIVE SUMMARY *(FULL REPORT AVAILABLE UPON REQUEST)*
Information Transportation Infrastructure
The Railroads and Interstates of the 21st Century - Missouri's Opportunity to Lead in Building Infrastructure for Commerce

October 10, 2010

Greentech Research Foundation, Inc. – Green M3 in coordination with Missouri Coalition of Data Centers

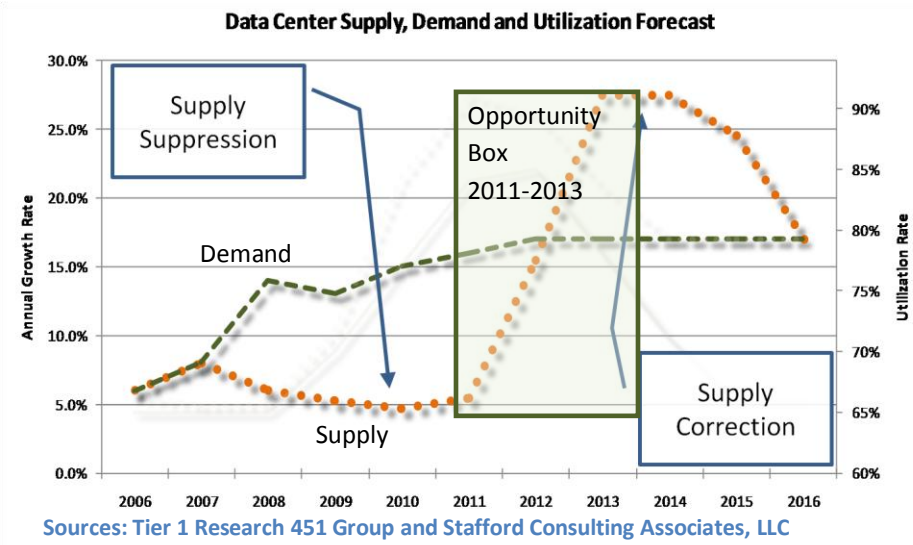
In the United States, quantum advances in the movement of goods, services or people were followed by an explosion of commercial economic activity. Data Centers (and the "Carrier Hotels", network "POPS"—or "Points of Presence"—and "Meet Me Rooms" that are housed in and around data centers) are the cloverleafs and train depots of the information main-lines and superhighways. Missouri and its communities are neither "stop-off" points nor hubs for digital transmission.

Over the next three to five years, national and multi-national corporations will invest tens of billions of dollars in constructing data centers. Data center infrastructure is the backbone on which the multiple and complex networks of information businesses are located. World Information Technology and Services Alliance (WITSA) reported in its 2009 Public Policy Report, and a separate subject intensive work on grid computing described the need for information technology infrastructure in these terms:

> *The Grid -- the IT infrastructure of the future -- promises to transform computation, communication, and collaboration. . . . Grids will become service-driven with lightweight clients accessing computing resources over the Internet. Datacenters will be safe, reliable, and available from anywhere in the world. Applications will be part of a wide spectrum of network-delivered services that include compute cycles, data processing tools, accounting and monitoring, and more.*

Data centers are becoming the new utility, with ubiquitous inclusion in nearly every transaction, every communication, and every information inquiry of everyday life. Limited access to capital during the great recession resulted in a slowdown of capital spending in the area of information infrastructure in 2009. Demand growth continued to be strong and separated from supply measures. Industry experts and analysts project that the separation of supply and demand will not continue, and that a growth/demand "bubble" is expected with higher than anticipated asset deployment over the next 3-4 years. The Opportunity Box period is when site selections are being made.

Figure 1: Data center supply suppression and correction create a pent up opportunity for economic development and investment.



Sources: Tier 1 Research 451 Group and Stafford Consulting Associates, LLC

- Supply was artificially suppressed
- We are in the beginning of a supply correction.
- 2011 – 2013 is the opportunity box for economic development decisions (with supply construction lagging that box by 12-24 months)

Business@the Speed of Thought is the term coined by Bill Gates, one of the great pioneers of the information age, and it is the name of his book, explaining that networking, data infrastructure, and data accessibility continue to be growing components of all business processes. The need for information and the need for speed of information and data is not only a business concern. Consumer habits and adoption and the demand growth of hand held, remote, or mobile telecommunication and multimedia devices has seen double-digit growth for each year of this century. Gates writes:

> *"The most meaningful way to differentiate your company from your competition ... is to do an outstanding job with information. How you gather, manage, and use information will determine whether you win or lose."*

Gates' principals also apply to the new realities of building sustainable economies of not only business, but also cities, regions, states, and nations.

The economic drivers identified as typical for data centers are unlike traditional manufacturing or distribution facilities. High capital, higher permanent job wages are noteworthy. The data center industry is driven by power consumption, with electrical power being the most critical input, and the most significant operating cost. Therefore, it is reasonable to segment the industry by looking at the power capacity of the facilities being built with some noteworthy characteristics as follows in Figure 3.

Figure 2: Data Center Market Segments by Power Capacity **Source: Stafford Consulting Associates, LLC**

	Retail Co location	Emerging Middle Wholesale	Large Scale Enterprise
Power Capacity	Up to 750 kW	750 kW to 5MW	5MW to 200 MW
Capital Expenditures	Lower per S.F. (range $200-$400 per S.F. with additional expenditure by tenants and multiple users for computer hardware ranging from $400 - $1,500 per S.F.	Varies by design	Highest per S.F. (range $800-$2,000 per S.F. with an additional $1,000-$1,500 per S.F. for computer hardware
Labor Profile	Higher jobs per S.F.	Emerging	Low headcount per S.F.
User Profile	Numerous users from local companies, each leasing a few square feet of rack space	Single user taking dedicated space in integrated infrastructure environment.	Fortune 100 single users creating continent scale dedicated centers. Users dictate infrastructure, power portfolio and carbon option requirements.

With the wide range of capital, construction employment and long-term employment that can be realized with this segmentation of the industry, the economic development impacts must be developed separately. Multiple reports have been compiled to understand and communicate the outcomes of attracting data centers to Missouri. Analysis of the data center sector was commissioned by the Missouri Coalition for Data Center (MCDC) in support of legislative initiatives debated in both the 2009 and 2010 Regular Session, as the 2010 Special Session of the Missouri General Assembly.

Figure 3: Summary of MCDC Data Center Revenues for Missouri **Source: Impact DataSource, 2010**

Summary of Total Revenues for the State
Over the First Ten Years
Ten Years of the Centers' Construction and Operations

	From Construction	From Operations	Total
Sales Taxes	$ 177,804,844	$ 245,740,623	$ 423,545,467
Personal Income Taxes	94,499,369	41,502,398	136,001,767
Corporate Income Taxes	40,968,761	159,189,938	200,158,699
Property Taxes	-	1,129,886	1,129,886
Total Revenue for the state	$ 313,272,974	$ 447,562,845	$ 760,835,819

With regard to the larger, single tenant, the economic development outcomes are highly influenced by the large capital investment and the resultant work availability for thousands of construction workers. Construction work, although not usually highlighted in economic development assessments is critically important in a 2010 outlook. Putting 1,000's of skilled workers on the job has potential to reduce unemployment of the state in a meaningful and long-lasting way.

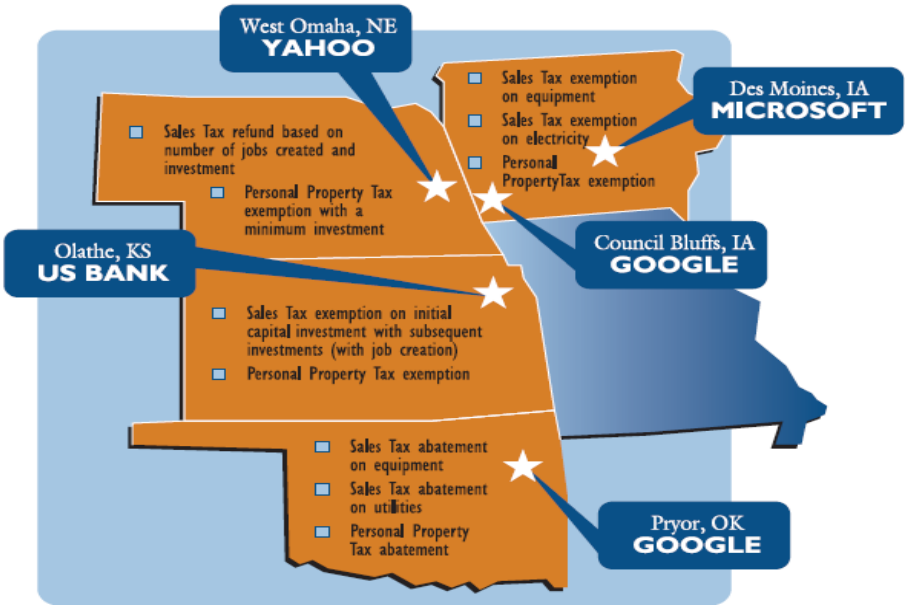
The impact of large, single tenant, "enterprise" data centers fully described and quantified in a recent report commissioned by ARG Investments, LLC, the developer of Ewing Business Park in Columbia. The full report is available upon request, and the abstract is as follows:

> *This economic impact study derives the result to the State of Missouri of attracting very large data center operation investments and their supporting electrical power generation capacity, including new industry investments in low-carbon, biomass power generation. The size of the resulting capital investments and construction trade projects in Missouri are extensive, at $ 9.6 billion over a ten year period. The construction jobs produced are predicted to average 4,000 per year, every year, over the next decade of development. The operational job gains, while not in scale with the capital investments, are significant at an average of 1,348 over that same ten year period. The total increase in employment due to direct and indirect impacts on sectors of the Missouri economy is projected to average 13,600 new jobs over the next decade. Various tax abatement incentives are modeled in order to attract the development, with Missouri predicted to yield a net fiscal income of $5.1 billion during the twenty five year span of the impact study, or just over $200 million per year.*

Parity: The Opportunity to Compete and WIN

Data Center advocates want parity; they want a level playing field with surrounding states. Jim Grice stated, "If the State government will level the playing field, we will win in the competition for data centers. Missouri has every natural and man-made amenity that data center operators want, except one. Missouri does not have a tax framework that recognizes the unique nature of data centers."

The Missouri Chamber of Commerce and Industry reviewed the business environments of the Midwest region, and displayed the findings on an explanative graphic:



The challenge to Missouri is in the existing tax framework. Site selectors want to rely primarily on "statutory" versus "discretionary" programs. Discretionary programs tend to be viewed as more "home town" benefits and require time consuming, and therefore costly, visits to individual states. Those visits are not necessary under statutory programs. Because the available tools to respond to the personal property tax exemption issue and the sales tax exemption issue on computer equipment and building materials are limited to a discretionary local program (Chapter 100), the "desk review" of Missouri incentives leaves the checklist blank. Missouri is typically disqualified against those states (described above) that have statutory framework to attract these information age users. A more detailed chart summarizing tax framework benefits offered by a sampling of the States that are competitive in this race to attract data center investment is available upon request. The glaring observation that can be made from review of the other states is Missouri's lack of statutory benefits needed by the data center industry. As a result of this deficiency, many data center site selection consultants will not even "show" sites in Missouri; instead those consultants show sites in Kansas and elsewhere.

In the case of the data center industry, the short-term impact potential is undeniable:

- Lower Unemployment by Putting Construction Workers Back to Work
- Increase Overall Economic Activity by Attract Large Capital Investment to the State
- Create and Attract New Management, Professional and Technical Services Job Opportunities
- Attract New High-Tech, High-Wage Permanent Jobs to the State
- Stabilize and Grow Electricity Industry by Large Power Purchases

The impacts set out above are very compatible with current needs of the State. The job creation results stimulate activity in the 3 of the top 5 job sectors experiencing the most job loss from 2005 to 2009 as reported by Market Street at the KC NW Region Planning Meeting on September 24, 2010.

Sector	Job Loss	Rank
Construction	- 20.4%	No. 2
Management of Companies and Enterprises	- 10.3%	No. 3
Information	- 6.5%	No. 5

Further the expected impacts will foster job growth in the most desired sectors. Based on the presentation of the of US Census data provided by Market Street in connection with the KC NW Planning Meeting on September 24, 2010 it is hard to argue the impact could better tailored to address the current needs of the State today.

Sector	Average Wage	Rank
Management of Companies and Enterprises	$80,075	No. 1
Professional and Technical Services Sector	$78,125	No. 2
Information	$63,662	No. 3
Construction	$52,906	No. 6

However, if Missouri could attain stature as the Midwest destination for large continental class data centers, the long-term impact potential is to locate multiple data center facilities of all segments and sizes of facilities. The clustering of data centers will yield other benefits and spin-off opportunities for follow-on industry, including:

- IT Development – Multiple "depots" will validate the state as a safe/redundant/economic area to locate, easing site selection for Tier 1 and Tier 2 suppliers and collaborators. In addition, users of the information super highway will tend to locate near the multiple and redundant information "depots".
- Energy – low carbon electrical generation – Multiple data center locations will result in opportunity to build new power generation capacity, generating more capital investment, capital, and long-term high-tech jobs.
- Low Carbon Fuel – Larger power purchases, and requirements for long-term low carbon fuel sources will generate a demand "pull" that will support new fuel sources, including biomass, wind, solar, and nuclear.

There is work to be done to meet these goals. Missouri's leadership must step forward and make the policy decision whether this industry, this capital investment and these opportunities are ones to pursue. The State through its Governor and General Assembly can level the playing field in the competition for 21st Century Information Technology and Data Center jobs. If the playing field is leveled, Missouri will create jobs. If not, these jobs and opportunities will go elsewhere. This industry sector requires a long trail of supporting industry.

Missouri has the existing infrastructure of power, fiber, and people to take its place in the Information Age. We must work to make our state government responsive to today's business realities.